PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 09 November 2000 (09.11.00)	
International application No. PCT/GB00/01081	**Applicant's or agent's file reference** AJR/40522
International filing date (day/month/year) 22 March 2000 (22.03.00)	**Priority date** (day/month/year) 22 March 1999 (22.03.99)
Applicant HODGSON, Julian	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

23 October 2000 (23.10.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Juan Cruz
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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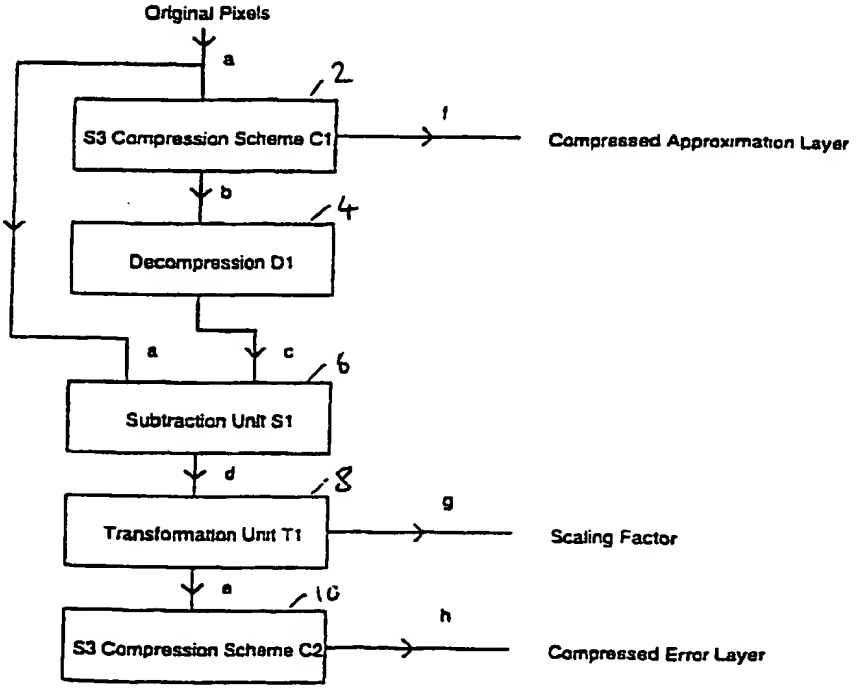
(81) Designated States: JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: IMAGE COMPRESSION AND DECOMPRESSION

(57) Abstract

The present invention compresses image data using a predetermined compression technique such as the Microsoft S3 compression scheme. The compressed image is then decompressed and difference values derived between the original image and the decompressed image. The thus derived difference values are then compressed for used in sub–different correction of the decompressed image and are transmitted or stored along with the compressed image data.



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INTERNATIONAL SEARCH REPORT

Int[redacted]al Application No
PCT/GB 00/01081

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, INSPEC, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LEGER A ET AL: "STILL PICTURE COMPRESSION ALGRORITHMS EVALUATED FOR INTERNATIONAL STANDARDISATION" PROCEEDINGS OF THE GLOBAL TELECOMMUNICATIONS CONFERENCE AND EXHIBITION(GLOBECOM),US,NEW YORK, IEEE, vol. -, 1989, pages 1028-1032, XP000093499 * page 31.7.3, right-hand column, paragraphs 4.1 and 4.2.1; page 31.7.4, left-hand column, points 1 and 3 of paragraph 4.2.3 *	1,2,4,6, 7,9,10, 12,13, 15-17

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 July 2000	31/07/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	With, F

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	BEERS A C ET AL: "RENDERING FROM COMPRESSED TEXTURES" COMPUTER GRAPHICS PROCEEDINGS (SIGGRAPH),US,NEW YORK, NY: ACM, 1996, pages 373-378, XP000682753 * page 375, right-hand column, first complete paragraph * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	WANG L ET AL: "Progressive image transmission by transform coefficient residual error quantization" IEEE TRANSACTIONS ON COMMUNICATIONS, JAN. 1988, USA, vol. 36, no. 1, pages 75-87, XP000198518 ISSN: 0090-6778 * page 75, right-hand column, first complete paragraph * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	CHEE Y -K: "Survey of progressive image transmission methods" INTERNATIONAL JOURNAL OF IMAGING SYSTEMS AND TECHNOLOGY, 1999, WILEY, USA, vol. 10, no. 1, pages 3-19, XP000805935 ISSN: 0899-9457 * p.4, middle of left-hand column; p. 12, left-hand column, first alinea of paragraph "V. Multistage residual quantization methods"; p. 14-16, paragraph "C. Residual Multiscale Coders; fig 8,13* ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	WALLACE G K: "The JPEG still picture compression standard" THIRD ANNUAL EIA DIGITAL VIDEO WORKSHOP, ARLINGTON, VA, USA, 9-11 OCT. 1991, vol. 38, no. 1, pages xviii-xxxiv, XP000297354 IEEE Transactions on Consumer Electronics, Feb. 1992, USA ISSN: 0098-3063 * pages xxx - xxxi, paragraph "9 Hierarchical Mode of Operation" * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	SCHRIEBER W F: "ADVANCED TELEVISION SYSTEMS FOR TERRESTRIAL BROADCASTING: SOME PROPOSED SOLUTIONS" PROCEEDINGS OF THE IEEE,US,IEEE. NEW YORK, vol. 83, no. 6, 1 June 1995 (1995-06-01), pages 958-981, XP000518746 ISSN: 0018-9219 * page 968, right-hand column, paragraph a) Multiresolution Source Coding" ---	1,2,4,6, 7,10,12, 13,15-17

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BURT P J ET AL: "THE LAPLACIAN PYRAMID AS A COMPACT IMAGE CODE" IEEE TRANSACTIONS ON COMMUNICATIONS,US,IEEE INC. NEW YORK, vol. COM 31, no. 4, 1 April 1983 (1983-04-01), pages 532-540, XP000570701 ISSN: 0090-6778 * page 532, whole right-hand column *	1,2,4,6, 7,9,10, 12,13, 15-17
X	KOSSENTINI F ET AL: "Image coding with variable rate RVQ" ICASSP-92: 1992 IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING (CAT. NO.92CH3103-9), SAN FRANCISCO, CA, USA, 23-26 MARCH 1992, pages 369-372 vol.3, XP000378946 1992, New York, NY, USA, IEEE, USA ISBN: 0-7803-0532-9 * figure 1 *	1,2,4,6, 7,9,10, 12,13, 15-17
X	FRANTI P ET AL: "Compression of digital images by block truncation coding: a survey" COMPUTER JOURNAL, 1994, UK, vol. 37, no. 4, pages 308-332, XP000483713 ISSN: 0010-4620 * page 318, paragraph "6.3. Discrete cosine transform" *	1,4,6,9, 12,15-17
X	DELP E J ET AL: "Image compression using block truncation coding (BTC)" IEEE TRANSACTIONS ON COMMUNICATIONS, SEPT. 1979, USA, vol. Com-27, no. 9, pages 1335-1342, XP002141720 ISSN: 0090-6778 * page 1341, paragraph "VI. Hybrid Formulation of BTC" *	1,4,6,9, 12,15-17
X	ALGAZI V R ET AL: "PERCEPTUALLY TRANSPARENT CODING OF STILL IMAGES" IEICE TRANSACTIONS ON COMMUNICATIONS,JP,INSTITUTE OF ELECTRONICS INFORMATION AND COMM. ENG. TOKYO, vol. E75 - B, no. 5, 1 May 1992 (1992-05-01), pages 340-348, XP000307374 ISSN: 0916-8516 * figures 1 and 2; page 340 and 341, paragraph "2. Differential Quantization" *	1,4,6,9, 12,15-17

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INTERNATIONAL SEARCH REPORT

Int[redacted]al Application No
PCT/GB 00/01081

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	KELLER R ET AL: "XMOVIE: ARCHITECTURE AND IMPLEMENTATION OF A DISTRIBUTED MOVIE SYSTEM" ACM TRANSACTIONS ON INFORMATION SYSTEMS,US,ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, vol. 13, no. 4, 1 October 1995 (1995-10-01), pages 471-499, XP000537936 ISSN: 1046-8188 * from page 477, paragraph 3.4 to end of page 478 *	1,6,9, 12,15-17
A	WILLIAMS L: "Pyramidal parametrics" COMPUTER GRAPHICS,US,NEW YORK, NY, vol. 17, no. 3, 25 July 1983 (1983-07-25), pages 1-11-11, XP002086498 ISSN: 0097-8930 * whole page 1; page 2, whole left-hand column *	1,6,9, 12,15-17
A	KNITTEL G ET AL: "HARDWARE FOR SUPERIOR TEXTURE PERFORMANCE" EUROGRAPHICS WORKSHOP ON GRAPHICS HARDWARE,XX,XX, 28 July 1995 (1995-07-28), pages 33-40, XP000865530 * page 35, paragraph "2 Block Truncation Coding / Color Cell Compression *	1,6,9, 12,15-17
P,A	WO 99 18537 A (S3 INC) 15 April 1999 (1999-04-15) * summary; page 3, lines 1-20; page 4, line 27 to page 5, line 17; page 20, lines 19-23 *	1,5

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte[redacted]al Application No
PCT/GB 00/01081

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9918537 A	15-04-1999	US 5956431 A	21-09-1999
		AU 9511698 A	27-04-1999

09/937376

PATENT COOPERATION TREATY

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REC'D 17 SEP 2001
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
AJR/40522		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB00/01081	22/03/2000	22/03/1999
International Patent Classification (IPC) or national classification and IPC H04N7/26		
Applicant IMAGINATION TECHNOLOGIES LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23/10/2000	12.09.2001
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer With, F Telephone No. +31 70 340 3809

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01081

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-11	as originally filed				

Claims, No.:

1-13	as received on	19/04/2001	with letter of	17/04/2001	

Drawings, sheets:

1/2,2/2	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4
	No:	Claims	1-3, 5-13
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-13
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D2: XP4075336, Ebrahimi, T.: 'MPEG-4 video verification model: A video encoding/decoding algorithm based on content representation', Signal Processing Image Communication, vol. 9, 1997, pages 367-384,

D3: XP1023580, ISO DIS 10918-1, extract from William B. Pennebaker et al. 'JPEG Still Image Data Compression Standard, Van Nostrand Reinhold, New York, 1993, ISBN 0-442-01272-1, pages 337-543

The documents D2 and D3 were not cited in the international search report. Copies of the documents are appended hereto.

Novelty

1. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of claims **1-3** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

1.1 With more particular reference to its Annexes B and J, **D3** discloses

a method of compressing a digital image data (see title) comprising the steps of:

compressing the image data using a predetermined compression technique (page J-1, last paragraph, penultimate sentence);

decompressing the thus compressed image (page J-3, first paragraph);

deriving difference values between the original and the decompressed image (page J-3, first paragraph, third sentence);

applying a scaling factor to the difference values (see paragraph B.3.1 - page B-19 - and the explanations below);

compressing the difference values after application of the scaling factor, for use in subsequent correcting of the decompressed image (paragraph 3.5, page 7, last alinea, third sentence); and

providing compressed image data and compressed difference values for decompression (paragraph 3.5, page 7, last paragraph and page 8, lines 1-3; and Figure 10 - see also page 17, first to third paragraphs - definitions of "differential ...").

Explanations:

In the hierarchical mode, the image data (non-differential frame) is compressed using DCT. Up to four quantisation tables may be used (see eg page B-12, parameter T_q). The quantization tables to be used are defined in the frame header (see paragraph B.2.2, first alinea and Figure B.3). The difference values (differential frame) are also compressed using DCT. The quantisation tables to be used are likely defined in the frame header (see B.3.1). According to paragraph B.3.1, third sentence (" Frame structure is identical to the frame in non-hierarchical mode") the differential frame header may also comprise markers (T_{qi}) for quantisation tables (see figure B.3 - Frame header syntax). Thus, the quantisation tables to be used for a differential frame may differ from the quantisation tables to be used for the non-differential frame. Use of a quantisation table for a non-differential frame and use of a different quantisation frame for a subsequent differential frame however amounts to applying a scaling factor to the differential frame (difference values).

In other words, D3 discloses the features "applying a scaling factor to the difference values; and compressing the difference values after application of the scaling factor, for use in subsequent correcting of the decompressed image".

To conclude D3 discloses all the features of claim **1**.

1.2 **D3** further discloses that the difference values are compressed using the

same compression method as the image (see in particular page J-3, fifth paragraph). D3 also discloses that the image data comprises colour data (see eg page 1, first sentence).

Thus, **D3** discloses the additional features of claim 2 and claim 3. Therefore, claims 2 and 3 lack novelty, too.

2. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of claims **5** and **6** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

Apparatus claims **5** and **6** mirror the steps of claims 1 and 2, respectively, in apparatus features and consequently lack novelty for the reasons mentioned in points 1.1 and 1.2 above, respectively.

3. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of independent claim **7** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

In addition to disclosing the steps of a compression method, **D3** discloses the steps of the corresponding

method for decompressing compressed digital image data (see paragraph J.2.3 and J.2.3.1 on page J-6) comprising the steps of:

decompressing the compressed image data using a predetermined de-compressing technique (IDCT - see last alinea of page J-1);

decompressing compressed difference values associated with the compressed image data (see paragraphs J.2.3 and J.2.3.1 on page J-6);

applying a reverse scaling factor to the decompressed difference value (as a different DCT quantization table may be used for the compression - see point 1.1abovee under the heading "Explanations" - and, thus, for the decompression of the differential frames, this amounts to the application of a reverse scaling

factor to the decompressed difference value); and

correcting the decompressed image data with the decompressed and reverse scaled difference values (see paragraphs J.2.3. and J.2.3.1 on page J-6).

4. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of independent **claim 8** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

In addition to the steps ofindependentt method claim 7, **D3** discloses that the compressed image data (non-differential frames) and the difference values (differential frames) are decompressed using the same decompression technique (IDCT - see eg page J-1, last alinea, and page J-3, fifth paragraph).

5. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of claims **9** and **10** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

Apparatus claims 9 and 10 mirror the steps of method claims 7 and 8 in apparatus features. Consequently, claims 9 and 10 are deprived of novelty for the reasons given in point 4 above.

6. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject matter of independent claims **11-13** is not new in respect of prior art as defined in the regulations (Rule 64(1) to (3) PCT).

D3 discloses methods according to claims 1 to 3, see point 1 above. D3 furthermore discloses the devices claimed in claims 11 to 13, see, in particular, page iii, third alinea, end of second sentence.

Inventive step

7. The present application does not satisfy the criterion set forth in Article 33(3)

PCT because the subject matter of claim **4** does not involve an inventive step (Rule 65(1) and (2) PCT).

The nearest state of the art is represented by **D3** which shows the method according to claim 1, see point 1 above.

The invention is distinguished therefrom by the image data comprising translucency data (additional feature introduced in claim 4).

Compressing translucency data of an image data is however well known in the art of digital image compression as can be seen from eg **D2**, page 375, left-hand column, first complete paragraph, third sentence. As also shown in the same passage of **D2** the skilled person knows that the same techniques for compression of pixel image data (eg RGB, YUV) can be applied for compression of alpha values (translucency data) for image data comprising such translucency data (eg YUVa or RGBa).

For this reason it was obvious for the person skilled in the art to arrive at the subject matter of claim **4**.

*****

CLAIMS

1. A method of compressing a digital image data comprising the steps of:

compressing the image data using a predetermined compression technique;

decompressing the thus compressed image;

deriving difference values between the original image and the decompressed image;

applying a scaling factor to the difference values;

compressing the difference values after application of the scaling factor, for use in subsequent correcting of the decompressed image; and

providing compressed image data and compressed difference values for decompression.

2. A method according to claim 1 in which the difference values are compressed using the same compression method as the image.

3. A method according to claim 1 or 2, in which the image data comprises colour data.

4. A method according to claim 1, 2 or 3, in which the image data comprises translucency data.

5. Apparatus for compressing digital image data comprising;

means for compressing the image data using a predetermined compressing technique;

means for decompressing the compressed image data;

means for deriving a difference value from the original image data and the decompressed image data;

means for applying a scaling factor to the difference values;

means for compressing the difference values after application of the scaling factor; and

means for providing the compressed image data and compressed difference values for subsequent decompression.

6. Apparatus according to claim 5 in which the means for compressing the difference values uses the same compression technique as the means for compressing the image data.

7. A method for decompressing compressed digital image data comprising the steps of:

decompressing the compressed image data using a predetermined decompressing technique;

decompressing compressed difference values associated with the compressed image data;

applying a reverse scaling factor to the decompressed difference values; and

correcting the decompressed image data with the decompressed and reverse scaled difference values.

8. A method according to claim 7 in which the compressed image data and difference values are both decompressed using the same decompression technique.

9. Apparatus for decompressing compressed digital image data comprising:

means for decompressing the compressed image data according to a predetermined decompression technique;

means for decompressing compressed difference values associated with the compressed image data;

means for applying a reverse scaling factor tot he difference values; and

means for correcting the decompressed image data with the decompressed and reverse scaled difference values.

10. Apparatus according to claim 9 in which the means for decompressing the image dat and the means for decompressing the difference values both use the same decompression technique.

11. A computer program product comprising image data compressed according to the method of claim 1, 2, 3, or 4.

12. A machine readable data carrier comprising image data compressed according to the method of claim 1, 2, 3, or 4.

13. A computer program product comprising a set of instructions to configure a computer to compress digital image data according to the method of claim 1, 2, 3, or 4.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
AJR/40522		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 00/ 01081	22/03/2000	22/03/1999
Applicant		
IMAGINATION TECHNOLOGIES LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 6 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   [ ] the text is approved as submitted by the applicant.

   [X] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [ ] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [X] because this figure better characterizes the invention.

   [ ] None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The part beginning with the words "Various... compresses" (line 1 and 2) is deleted.

INTERNATIONAL SEARCH REPORT

International Application No
[redacted]/GB 00/01081

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, INSPEC, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LEGER A ET AL: "STILL PICTURE COMPRESSION ALGRORITHMS EVALUATED FOR INTERNATIONAL STANDARDISATION" PROCEEDINGS OF THE GLOBAL TELECOMMUNICATIONS CONFERENCE AND EXHIBITION(GLOBECOM),US,NEW YORK, IEEE, vol. -, 1989, pages 1028-1032, XP000093499 * page 31.7.3, right-hand column, paragraphs 4.1 and 4.2.1; page 31.7.4, left-hand column, points 1 and 3 of paragraph 4.2.3 * --- -/--	1,2,4,6, 7,9,10, 12,13, 15-17

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 July 2000	31/07/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	With, F

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Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	BEERS A C ET AL: "RENDERING FROM COMPRESSED TEXTURES" COMPUTER GRAPHICS PROCEEDINGS (SIGGRAPH),US,NEW YORK, NY: ACM, 1996, pages 373-378, XP000682753 * page 375, right-hand column, first complete paragraph * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	WANG L ET AL: "Progressive image transmission by transform coefficient residual error quantization" IEEE TRANSACTIONS ON COMMUNICATIONS, JAN. 1988, USA, vol. 36, no. 1, pages 75-87, XP000198518 ISSN: 0090-6778 * page 75, right-hand column, first complete paragraph * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	CHEE Y -K: "Survey of progressive image transmission methods" INTERNATIONAL JOURNAL OF IMAGING SYSTEMS AND TECHNOLOGY, 1999, WILEY, USA, vol. 10, no. 1, pages 3-19, XP000805935 ISSN: 0899-9457 * p.4, middle of left-hand column; p. 12, left-hand column, first alinea of paragraph "V. Multistage residual quantization methods"; p. 14-16, paragraph "C. Residual Multiscale Coders; fig 8,13* ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	WALLACE G K: "The JPEG still picture compression standard" THIRD ANNUAL EIA DIGITAL VIDEO WORKSHOP, ARLINGTON, VA, USA, 9-11 OCT. 1991, vol. 38, no. 1, pages xviii-xxxiv, XP000297354 IEEE Transactions on Consumer Electronics, Feb. 1992, USA ISSN: 0098-3063 * pages xxx - xxxi, paragraph "9 Hierarchical Mode of Operation" * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	SCHRIEBER W F: "ADVANCED TELEVISION SYSTEMS FOR TERRESTRIAL BROADCASTING: SOME PROPOSED SOLUTIONS" PROCEEDINGS OF THE IEEE,US,IEEE. NEW YORK, vol. 83, no. 6, 1 June 1995 (1995-06-01), pages 958-981, XP000518746 ISSN: 0018-9219 * page 968, right-hand column, paragraph a) Multiresolution Source Coding" ---	1,2,4,6, 7,10,12, 13,15-17

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BURT P J ET AL: "THE LAPLACIAN PYRAMID AS A COMPACT IMAGE CODE" IEEE TRANSACTIONS ON COMMUNICATIONS,US,IEEE INC. NEW YORK, vol. COM 31, no. 4, 1 April 1983 (1983-04-01), pages 532-540, XP000570701 ISSN: 0090-6778 * page 532, whole right-hand column * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	KOSSENTINI F ET AL: "Image coding with variable rate RVQ" ICASSP-92: 1992 IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING (CAT. NO.92CH3103-9), SAN FRANCISCO, CA, USA, 23-26 MARCH 1992, pages 369-372 vol.3, XP000378946 1992, New York, NY, USA, IEEE, USA ISBN: 0-7803-0532-9 * figure 1 * ---	1,2,4,6, 7,9,10, 12,13, 15-17
X	FRANTI P ET AL: "Compression of digital images by block truncation coding: a survey" COMPUTER JOURNAL, 1994, UK, vol. 37, no. 4, pages 308-332, XP000483713 ISSN: 0010-4620 * page 318, paragraph "6.3. Discrete cosine transform" * ---	1,4,6,9, 12,15-17
X	DELP E J ET AL: "Image compression using block truncation coding (BTC)" IEEE TRANSACTIONS ON COMMUNICATIONS, SEPT. 1979, USA, vol. Com-27, no. 9, pages 1335-1342, XP002141720 ISSN: 0090-6778 * page 1341, paragraph "VI. Hybrid Formulation of BTC" * ---	1,4,6,9, 12,15-17
X	ALGAZI V R ET AL: "PERCEPTUALLY TRANSPARENT CODING OF STILL IMAGES" IEICE TRANSACTIONS ON COMMUNICATIONS,JP,INSTITUTE OF ELECTRONICS INFORMATION AND COMM. ENG. TOKYO, vol. E75 - B, no. 5, 1 May 1992 (1992-05-01), pages 340-348, XP000307374 ISSN: 0916-8516 * figures 1 and 2; page 340 and 341, paragraph "2. Differential Quantization" * --- -/--	1,4,6,9, 12,15-17

2

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	KELLER R ET AL: "XMOVIE: ARCHITECTURE AND IMPLEMENTATION OF A DISTRIBUTED MOVIE SYSTEM" ACM TRANSACTIONS ON INFORMATION SYSTEMS,US,ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, vol. 13, no. 4, 1 October 1995 (1995-10-01), pages 471-499, XP000537936 ISSN: 1046-8188 * from page 477, paragraph 3.4 to end of page 478 *	1,6,9, 12,15-17
A	WILLIAMS L: "Pyramidal parametrics" COMPUTER GRAPHICS,US,NEW YORK, NY, vol. 17, no. 3, 25 July 1983 (1983-07-25), pages 1-11-11, XP002086498 ISSN: 0097-8930 * whole page 1; page 2, whole left-hand column *	1,6,9, 12,15-17
A	KNITTEL G ET AL: "HARDWARE FOR SUPERIOR TEXTURE PERFORMANCE" EUROGRAPHICS WORKSHOP ON GRAPHICS HARDWARE,XX,XX, 28 July 1995 (1995-07-28), pages 33-40, XP000865530 * page 35, paragraph "2 Block Truncation Coding / Color Cell Compression *	1,6,9, 12,15-17
P,A	WO 99 18537 A (S3 INC) 15 April 1999 (1999-04-15) * summary; page 3, lines 1-20; page 4, line 27 to page 5, line 17; page 20, lines 19-23 *	1,5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
/GB 00/01081

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9918537 A	15-04-1999	US 5956431 A	21-09-1999
		AU 9511698 A	27-04-1999